Alg. 2 Warm Up #2-1

Get a warm up sheet by the door.
This is Week 2, day 1.

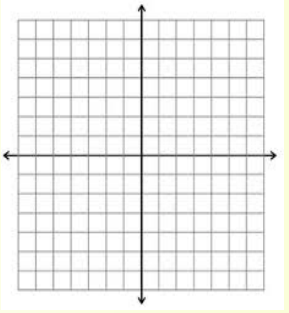
Number the problems and show your work:

Solve for y:

1. $3x - 4y = 12$
2. $x = 2y - 8$
3. $x = 4y^2 + 6$

4. Sketch the graph and describe completely:

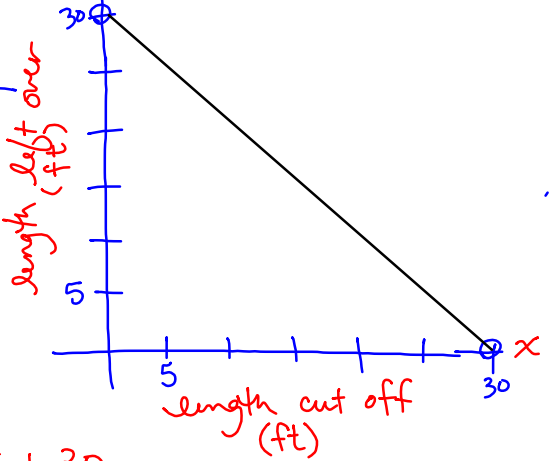
$y = (x + 3)(x - 5)$



HW Questions:

1-19. Jill needs to cut a smaller piece from a 30-foot length of lumber. Create multiple representations ($x \rightarrow y$ table, graph, and equation) for the function with x-values that are the length of the piece Jill cuts off and y-values that are the length of the piece that is left over. Which representation best portrays the situation? Why? Explain.

x: length cut off	y: length left over
1	29
2	28
5	25
10	20
15	15
20	10



$y = -x + 30$

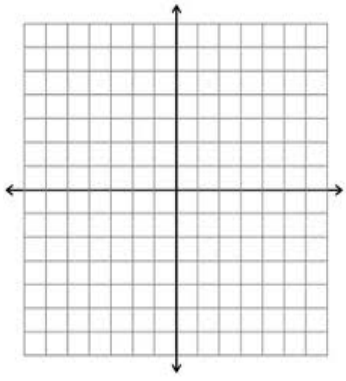
1-20. Make a table and graph the function $f(x)=\frac{1}{2}x^2$. Describe all of the possible input and output values.

x → Domain

$x = \mathbb{R}$

y → Range

y



1-21. Given $f(x)=-\frac{2}{3}x+3$ and $g(x)=2x^2-5$, complete parts (a) through (f) below.

a. Calculate $f(3)$.

b. Solve $f(x)=-5$.

c. Calculate $g(-3)$.

d. Solve $g(x)=-7$.

e. Solve $g(x)=8$.

f. Solve $g(x)=9$.

$2x^2-5=8$

$\frac{2x^2}{2}=\frac{13}{2}$

$\sqrt{x^2}=\pm\sqrt{\frac{13}{2}}$

$x=\pm\sqrt{\frac{13}{2}}$

$x\approx\pm 2.55$

$2x^2-5=-7$

$\frac{2x^2}{2}=\frac{-2}{2}$

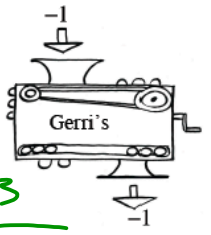
$\sqrt{x^2}=\pm\sqrt{-1}$

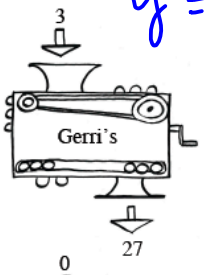
$x=\pm\sqrt{-1}$

No real solution

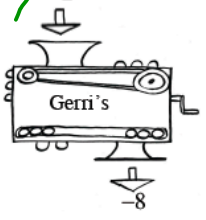
1-22. Gerri made a function machine. Below are four pictures of her machine. (Note that these are all pictures of the same function machine.) Find the equation for Gerri's function machine.

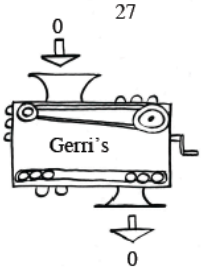
$y = x^3$





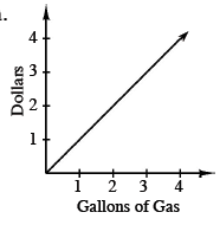
−2	−1	0	3
−8	−1	0	27



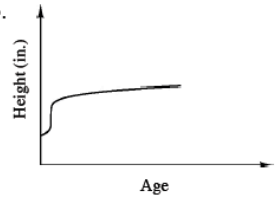


1-23. Examine each graph below. Based on the shape of the graph and the labels on the axes, write a sentence to describe the relationship that each graph represents. Then state which axis represents the independent variable and which one represents the dependent variable.

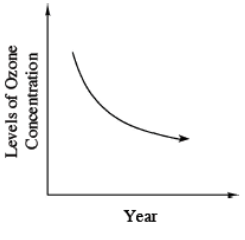
a.



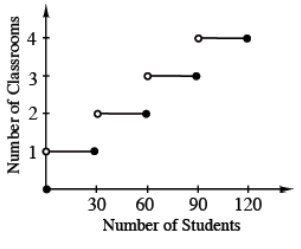
b.



c.



d.



e. What are all of the possible inputs of the graph in part (d)? What are all of the possible outputs?

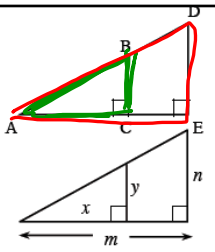
inputs (x): whole #'s from 0 to 120

outputs (y): y = 0, 1, 2, 3, 4

$0 \le x \le 120$ whole numbers

1-24. Consider triangles ABC and ADE at right. Give a convincing argument why $\Delta ABC \sim \Delta ADE$. Then use what you know about similar triangles to complete each of the following ratios for the triangles.

AA~ Post.



a. $\frac{y}{x} = \frac{?}{?}$ $\frac{n}{m}$

b. $\frac{n}{y} = \frac{?}{?}$ $\frac{m}{x}$

1-25. Note: The stoplight icon to the right of a problem indicates that there is an error in the problem.

Find the error in the solution at right. Explain what the error is and solve the equation correctly. Show how to check your solution to be sure that it is correct.

$$3(x-2)-2(x+7)=2x+17$$
$$3x-6-2x+14=2x+17$$
$$x+8=2x+17$$
$$-9=x$$

$3x-6-2x-14=2x+17$

$x-20=2x+17$

$-20=x+17$

$-17 \quad -17$

$-37=x$

$x=-37$

CP: 1-10

1.1.2 How can I use my graphing calculator?

Using a Graphing Calculator to Explore a Function

In Algebra 1 you learned that multiple representations such as situations, tables, graphs, and equations along with their interconnections are useful for learning about functions. A graphing calculator can be a very useful tool for generating different representations quickly. Today, you will use this tool to explore a function. You will describe your function completely to the class.

1-10. Your team will use graphing calculators to learn about one of the following functions.

i. $y=2\sqrt{9-x}-4$

ii. $y=\sqrt{100-x^2}$

iii. $y=3\sqrt{x+4}-6$

iv. $y=3\sqrt{4-x}-3$

v. $y=-2\sqrt{25-x^2}+8$

vi. $y=-3\sqrt{x+9}+4$

vii. $y=2\sqrt{25-x^2}-1$

viii. $y=\sqrt{4-x}-1$

Your Task: Describe your team's function in as much detail as possible. Use your graphing calculator to help you generate a table and a complete graph of your function. Remember that drawing a complete graph means:

- Use graph paper.
- Scale your axes appropriately.
- Label key points.
- Plot points accurately.

As you work, keep your graphing calculators in the middle of your workspace, so that you can compare your screens and all team members can see and discuss your results. Be sure to record what you learn as you explore your function. As a team, you will be preparing a report about your function for the class. Consider the Discussion Points below as you work.

Discussion Points

What are the key points on the graph? Where are they exactly?

Can we identify at least five integer inputs that give integer values as outputs?

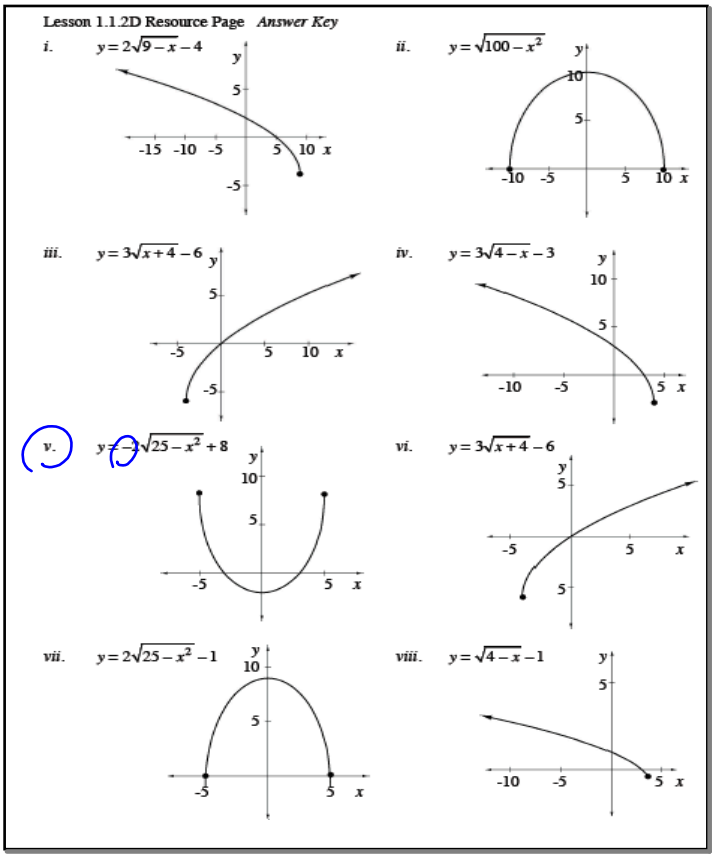
Are there values of x or y that do not make sense?

How high or low does the graph go?

Did the graphing calculator show an accurate graph?

How can we be sure the graph is complete?

September 12, 2016



Lesson 1.1.2D Resource Page *Answer Key*

i. $y = 2\sqrt{9-x} - 4$

ii. $y = \sqrt{100 - x^2}$

iii. $y = 3\sqrt{x+4} - 6$

iv. $y = 3\sqrt{4-x} - 3$

v. $y = -2\sqrt{25 - x^2} + 8$

vi. $y = 3\sqrt{x+4} - 6$

vii. $y = 2\sqrt{25 - x^2} - 1$

viii. $y = \sqrt{4-x} - 1$

New teams... Team Roles for today:

Focus on:

Facilitator: Get your team started promptly and keep them moving! Have different people read aloud as you go through the task.

Task Manager: Make sure everyone is included and understands what's going on. Push people to give reasons for their answers.

Resource Manager: When someone in the team has a question, see if someone in your team can answer it. If no one can answer it, ask the teacher for help.

Reporter/Recorder: Make sure domain and range descriptions are clear!

Get out a piece of graph paper for today's classwork.
Paper heading: (☆ Each person)

CP's: 1- #26 ---> 30

Name_____
Per.____ Team #_____

Make sure you answer all the questions and stay together as a team.

1.1.3 Which values are possible? P. 15

Domain and Range

In Lesson 1.1.2 you worked with your graphing calculator to see complete graphs of functions and to determine what information was useful to describe those functions completely. In this lesson you will look at more functions, this time thinking about the input and output values that are possible. You will also learn to use some additional tools on your graphing calculator that will allow you to see a complete graph. As you work with your team, remember to ask each other questions such as:

What values are possible?

Can we see the complete graph?

What other information can we use to describe the function?

1-26. Jerrod and Sonia were working with their team on problem 1-2 to put the function machines in order. These functions are reprinted for you below.

$f(x) = \sqrt{x}$ $\quad g(x) = -(x-2)^2$

$h(x) = 2^x - 7$ $\quad k(x) = -\frac{x}{2} - 1$

a. Jerrod first put an input of 6 into the function $g(x) = -(x-2)^2$ and got an output of -16. He wanted to try $f(x) = \sqrt{x}$ as his next function in the order, but he thinks there might be a problem using -16 as an input. Is there a problem? Explain.

b. Because it is not possible to take the square root of -16, it can be said that -16 is not in the **domain** of the function $f(x)$. The **domain** of a function is the collection of numbers that are possible inputs for that function. With your team, find two other numbers that are *not* part of the domain of $f(x)$. Then describe the domain. In other words, what are all of the numbers that *can* be used as inputs for the function $f(x)$?

c. Sonia claimed that $g(x)$ could not possibly be the last function in the order for problem 1-2. She justified her thinking by saying, *"Our final output has to be 11, which is a positive number. The function $g(x)$ will always make its output negative, so it can't come last in the order."* Discuss this with your team. Does Sonia's logic make sense? How did she know that the output of $g(x)$ would never be positive?

d. Because the outputs of the function $g(x)$ do not include certain numbers, it can be said that positive numbers are not part of the **range** of the function $g(x)$. The **range** of a function is the set of all of the possible values that can be outputs. With your team, describe the range of the function $g(x)$. In other words what are all of the values that *can* be outputs of the function?

1-27. Use your graphing calculator to help you draw a complete graph of $y = (x+1)(x-9)$.

a. Describe the graph completely.

b. What window settings allow you to see the complete graph?

c. How are the settings related to domain and range?

1-28. Use your graphing calculator to draw a complete graph of $y = (x-12)^2 + 11$.

a. What happens when you use the standard window?

b. What window settings did you use to see enough of the graph to help you visualize and draw a complete graph?

c. What are the domain and range of the function?

1-29. Now you will reverse your thinking to create a graph with a given domain and range.

a. Sketch a function that has a domain of all real numbers between and including -3 and 10 (written $-3 \le x \le 10$) and a range of all real numbers between and including -4 and 6 (written $-4 \le y \le 6$). You do not have to write an equation for your function. Verify your endpoints with your team. Be creative.

b. Sketch a function with a domain of all real numbers and a range of the values 2, 4, 5, and 8 (written $y = 2, 4, 5, 8$).

The domain of all real numbers can be written $-\infty < x < \infty$. The symbols $-\infty$ and ∞ represents positive and negative **infinity**. They mean that the domain goes on without ending in the positive and negative direction. Infinity is not a number; it is a concept.

1-30. How can a graphing calculator help you find the solution to a system of equations? Consider this system:

$$5x - y = 35$$
$$3x + y = -3$$

a. First graph the system in a standard window. Can you see the solution on your screen?

b. To find the solution you will need to change the window on your calculator. Discuss with your team what maximum value, minimum value, and scale you should use for the x- and y-axes in order to see the intersection. After you have decided, check your conclusion on the graphing calculator.

c. Use a "trace" function on your calculator to find the solution from the graphs. Then solve the system algebraically.

d. Discuss the two methods with your team. Explain which one your team prefers and why.

HW: 1- #34 ---> 40